

DOCUMENT RESUME

ED 133 586

08

CE 009 688

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TITLE Secondary-Post Secondary Curriculum Articulation Project for Vocational Technical Education in Minnesota. Final Report.
INSTITUTION Minnesota Research Coordinating Unit for Vocational Education, Minneapolis.
SPONS AGENCY Minnesota State Dept. of Education, St. Paul. Div. of Vocational and Technical Education.
REPORT NO VT-103-559
BUREAU NO 3-C-76
PUB DATE 30 Jun 76
NOTE 47p.
EDRS PRICE MF-\$0.83 HC-\$2.06 Plus Postage.
DESCRIPTORS Academic Standards; *Articulation (Program); College Curriculum; College School Cooperation; *Curriculum Development; Evaluation Criteria; High School Curriculum; Performance Based Education; *Post Secondary Education; Program Descriptions; Program Evaluation; *Secondary Education; State Programs; State Standards; Statewide Planning; Student Evaluation; Student Records; Task Analysis; *Vocational Education
IDENTIFIERS *Minnesota

ABSTRACT

A project was conducted to develop and pilot test a process for vertically articulating curriculum between the secondary and postsecondary levels of vocational-technical education in Minnesota. Subgoals were to develop and validate a procedure for developing statewide task lists and competency records and to develop a process for teacher and administrator utilization of the articulation products. The five areas of research and development included: (1) articulation product development, (2) articulation process development, (3) dissemination plan development, (4) production of publications for regional articulation, and (5) identification of data sources for updating and revising articulation products. A procedure for developing articulation products was developed and validated, and a regional process was successfully piloted through the developmental phase of automotive mechanics articulation in three pilot sites. Five publications were printed and 12 are currently being printed. Diffusion of project goals, information, and products was accomplished statewide and nationally. Both the procedure for product development and the regional dissemination process have been adopted by the State Department of Education. It was concluded that the overall evaluation of the project was positive. (NJ)

ED133586

SECONDARY - POST SECONDARY
CURRICULUM ARTICULATION PROJECT
for VOCATIONAL TECHNICAL EDUCATION
in MINNESOTA

A FINAL REPORT

PROJECT NUMBER: 3 - C - 76

CONDUCTED USING GRANT AWARDED BY
DIVISION OF VOCATIONAL - TECHNICAL EDUCATION
MINNESOTA DEPARTMENT OF EDUCATION
UNDER PART C/D OF PUBLIC LAW 90-576

DR. LAURA J. BURGER, PROJECT DIRECTOR 1975-76

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JUNE 30, 1976

VT-103-559

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Final Report

Project Number: 3 - C - 76

**CURRICULUM ARTICULATION PROJECT
for VOCATIONAL TECHNICAL EDUCATION
in MINNESOTA**

**Research and Development Project
in Career Education**

**Conducted Using Grant Awarded by
Division of Vocational-Technical Education
Minnesota Department of Education
Under Part C/D of Public Law 90-576**

The project reported herein was performed pursuant to a grant from the Division of Vocational-Technical Education, Minnesota Department of Education. Grantees undertaking such projects under Division sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated, therefore, do not necessarily represent official Division position or policy.

**Laura J. Burger, Ph. D.
Director, 1975-76**

Preface

Over the past years, the state of Minnesota has demonstrated a strong commitment to vocational education. There are now 33 post secondary vocational education institutions. Approximately 10 years ago, provisions were made to support the growth and development of vocational programs at the secondary level. A priority was placed on assisting groups of districts that wish to share dollars and students to offer a greater variety of vocational programs to secondary students. Fifty-seven cooperative centers offer vocational training to secondary school students at the present time. It is anticipated that others will be developed until 75 centers serve all districts in Minnesota. Secondary vocational programs are also offered at 400 high schools in Minnesota.

Forseeing the problems that could result from the lack of vertical curriculum articulation between secondary and post secondary educational offerings, there emerged a need for this research project. Vertically articulated programs, when achieved, allow students to progress from secondary to post secondary programs, from secondary programs to the world of work, and from the world of work to post secondary institutions without gap or overlap in vocational instruction. It is anticipated that the findings from this study will be useful for adult vocational programs as well. The problem of "how do we, in Minnesota, achieve vertically articulated curricula", is the basis of this research.

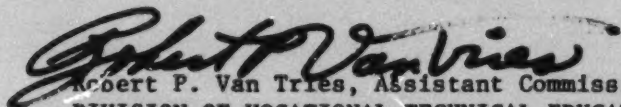

Robert P. Van Tries, Assistant Commissioner
DIVISION OF VOCATIONAL-TECHNICAL EDUCATION

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CHAPTER I

BACKGROUND OF THE PROJECT

INTRODUCTION

Over the past three years, the Vocational Division of the Minnesota State Department of Education has expended nearly \$200,000 on the discovery and development of a procedure for developing those products (task lists and competency records) which can be used to articulate secondary and post secondary vocational technical curriculum in Minnesota. An articulated curriculum allows a student to move from the secondary level of vocational training (or from on-the-job experience) to the post secondary level of vocational training without having to repeat instruction for learning those tasks already mastered. Likewise, an articulated curriculum provides opportunity for students to acquire more complete training because the tasks to be performed are explicit and instructors are less apt to inadvertently omit the teaching of important content from their occupational programs.

BACKGROUND

During 1974-75, progress was made toward identifying and validating a procedure for developing those products (task lists and competency records) needed for articulating occupational programs offered in Minnesota's secondary and post secondary vocational technical institutions. The procedures developed for producing these articulation products (task lists and competency records) emerged from actions taken in auto mechanics occupations and clerical secretarial occupations.

Last year a Handbook for vocational-technical instructors and coordinators was also published. The Handbook explains to instructors how they can deliver recommended task-based content to students. Competency based, personalized instruction is advocated in the Handbook.

A complete description of the research and development activities that relate to vocational technical curriculum articulation in Minnesota is given in the Final Report for 1972-75 entitled Developing Articulated High School and Post High School Vocational Technical Curricula in Minnesota. It is assumed that the reader who wishes additional background information on the underlying rationale for this project will refer to that document.

CHAPTER II

PROJECT GOAL AND PROCEDURES

INTRODUCTION

This chapter identifies the goal of this project and documents the procedures used in each of its five areas of research and development. In the latter sections of this chapter actions taken in two service areas of this project are explained.

THE GOAL of the PROJECT

The goal of this project is to develop and pilot a process for vertically articulating curriculum between the secondary and post secondary levels of vocational technical education throughout the state of Minnesota. This goal includes both (a) the development and validation of a procedure for developing those statewide products (task lists and competency records) needed for articulation and (b) the development of a process for teachers and administrators to follow as they utilize the articulation products through working with schools in their region of the state.

RESEARCH AND DEVELOPMENT AREAS (1975-76)

Attainment of the project goal required that five areas of research and development be identified. Those areas were: I. Development and validation of a procedure for developing task lists for those occupational programs approved by industrial representatives from throughout the state of Minnesota; II. Development and validation of a format for competency records which can be used in secondary and post secondary vocational schools to replace and/or supplement the traditional report

card; III. Development of a dissemination plan which encourages statewide adoption of articulation products; IV. Development of publications useful to local school personnel, as teachers engage in the articulation process and convert their teaching to competency based instruction; V. Identification of possible data sources that can be used in the future to update and revise the articulation products so that a complete curriculum development system emerges for the state. The procedures followed in each of the above cited areas of research and development are outlined in the sections that follow.

R & D AREA I: Development and validation of a procedure for developing task lists for occupational programs approved by Industrial representatives from throughout the state of Minnesota.

The procedure for the development of task lists was devised through actions taken in automotive occupations and validated through use in clerical secretarial occupations. Formative evaluation was an important part of this developmental research effort in that many pieces of data were informally gathered, used and re-evaluated as the task list development and validation efforts continued. A description of the procedure used for developing three (3) task lists in automotive occupations is given below. This same procedure was subsequently used for the development of twelve (12) clerical secretarial task lists. Each task list represents an occupational program from which industry representatives from throughout the state of Minnesota have indicated that students could graduate and find jobs.

PROCEDURE FOR DEVELOPING TASK LISTS
FOR OCCUPATIONAL PROGRAMS IN MINNESOTA

1. Resources (task lists, performance objectives, etc.) are collected

for project use.

2. A subject matter consultant for the occupational program area is identified, hired and oriented to the project goals and resources.
3. A first draft of task list for the entire program area is constructed, after thorough review of all resources and after having interviewed a number of teachers throughout the state.
4. Instructors from throughout Minnesota are identified to make up a WORKING COMMITTEE. Program supervisors at the State Department of Education suggest names of individuals who would be effective on this committee.
5. A large number of vocational teachers are surveyed to determine job titles common assumed by graduates of the program area.
6. Tentative titles for occupational programs are decided upon and tentative job descriptions are written. Separate task lists for each occupational program area can then be developed by the working committee, project staff and the state supervisors for that program area.
7. The draft of each task list is submitted to a committee of industry representatives from throughout Minnesota. This meeting is one day long. The purpose of the meeting is to bring together employers who are in charge of hiring, firing, supervising, and promoting employees. In the presence of the working committee, industry representatives are asked to respond to the range of occupational programs offered, to judge the adequacy of the number and description of tasks suggested on each task list, and to point out the tasks they feel are "optional" and those tasks that are "very important" for the student to be able to perform upon taking the job described in the job description. The competency record is reviewed by industry representatives to determine whether or not modifications are needed to adequately communicate student performance to prospective employers.
8. The task lists and competency records for each approved occupational program is printed in booklet form. These products are then made available to secondary and post secondary instructors in Minnesota for the purpose of CURRICULUM ARTICULATION.

A description of the proposed task list updating strategy is given later in this chapter under R & D Area IV.

R & D AREA II: Development and validation of a format for Competency Records which can be used in secondary and post secondary vocational schools to replace and/or supplement the traditional report card.

The format of the competency record was designed to coincide with

the format of the task list for each occupational program. The following example shows the format of the task list:

TASK LIST	
Area of Competency #1	
Perform Steering and Suspension System Service	
IA.	Inspect Steering and Suspension System
1.	Inspect springs for breakage and sag
	a. Coil
	b. Leaf
	c. Torsion bar
2.	Inspect shock absorber for leaks, operation and mounting
	a. Standard
	b. Air
3.	Inspect control arm bushings for distortion and wear
4.	Check ball joints for wear and lubrication
5.	Check spindles and steering knuckles for bent parts and worn parts
6.	a. Air pressure
	b. Proper size
7.	Inspect wheel bearings for noise and condition
8.	Inspect tie rods for looseness, seals and bent rods
9.	Inspect idler arms for worn bushings
10.	Inspect stabilizer bars for breakage and bushing wear
11.	Inspect steering arms for damage
12.	Inspect drag links for damage and loose ends
13.	Inspect bell-crank assemblies for damage and wear
14.	Inspect rear-axle housing for damage, broken welds, bushings and leaks
15.	Inspect frame and body for bends, cracks damage and height
16.	Inspect sway bars for bushing wear
17.	Inspect strut bars for bushing wear
18.	Inspect solid-beam axles for damage and bushing wear
19.	Inspect trailing and torque arm for distortion
20.	Inspect trunnions for looseness
21.	Check torsion bar height
22.	Inspect front wheel drive/steering axle for worn parts

TABLE I
An example of the format of the Task List

Each statement of competency on the Task List is assigned a roman numeral. Under the statement of competency the appropriate tasks are listed and numbered.

- IIA. Remove and Replace Steering and Suspension Components**
1. R/R springs and adjust
 - a. Coil
 - b. Leaf
 - c. Torsion bar
 2. R/R shock absorbers
 - a. Standard shock components
 - b. Air shock components
 3. R/R control arm
 4. R/R ball joints
 5. R/R spindles and steering knuckles
 6. Mount and demount tires. Use tire changing machine
 - a. Repair tires
 7. R/R wheel bearings, pack and adjust
 - a. Replace seals
 8. R/R tie rods and check toe-in
 9. R/R idler arm and adjust
 10. R/R stabilizer bars
 11. R/R steering arms
 12. R/R drag links and adjust
 13. R/R bell-crank assemblies

TABLE II
A Statement of Competency with tasks listed

The competency record is used to replace and/or supplement the traditional report card. Only the Statements of Competency appear on the competency record as can be seen in the example below.

An Excerpt of the COMPETENCY RECORD for Auto Mechanics Occupations						
AREA OF COMPETENCE #1: PERFORM STEERING AND SUSPENSION SERVICE	Secondary			Post Secondary		
	Grade	Year	Teacher	Grade	Year	Teacher
IA. Inspect Steering and Suspension System						
IIA. Remove and Replace Steering and Suspension Components						
IIIA. Diagnose Steering and Suspension Systems						
IB. Inspect Manual and Power Steering Systems						
IIB. Remove and Replace Manual and Power Steering System Components						
IIIB. Rebuild Manual and Power Steering Components						
IVB. Diagnose Manual and Power Steering System						
COMMENTS:						

TABLE III:
An illustration of the Competency Record format

If a student or teacher wishes to know what tasks are included in any statement of competency he/she must refer back to the Task Lists. Generally it is required that the student learn to perform all of the tasks listed under any statement of competency before he or she is given a grade in the appropriate space on the Competency Record. Exceptions are sometimes made, however, when teachers (during regional articulation sessions) jointly agree to omit certain task(s) due to lack of equipment, or limited space, etc.

The grading scale used for an occupational program appears to be specific to the nature of the subject matter and the requirements of industry. Verbal interaction among teachers and industry representatives resulted in a grading scale for automotive occupations which is based upon the amount of supervision needed by the student (graduate).

COMPETENCY RECORD

Occupational Programs: Automotive Mechanic, Service Center Mechanic, Lubrication Specialist

This competency record tells what the student, who is named below, has demonstrated that he or she can do. A committee of industrial representatives from throughout Minnesota assisted in identifying the competencies needed by graduates of the occupational programs shown above. For more specific information, refer to the task list for each occupational program.

Grading:	5 - able to help others; very competent
	4 - able to perform the task(s) without supervision; competent
	3 - able to perform the task(s) with limited supervision
	2 - able to perform the task(s) with direct supervision
	1 - unable to perform the task(s)
	✓ - received introduction only

TABLE IV
The Grading Scale as it appears on the Automotive Mechanics
Competency Record

In contrast to this, the important factors used in clerical/secretarial occupations to determine student competence are usually speed and accuracy.

COMPETENCY RECORD

HUMAN RELATIONS AND PERSONAL DEVELOPMENT

OCCUPATIONAL PROGRAM: **Secretary/Shorthand**

Name of Student _____

This competency record tells what the student, who is named above, has demonstrated that he or she can do. A graduate is one who has demonstrated competent performance of all the tasks designated for this occupational program. This competency record is to be used as an expansion of and/or supplement to the traditional report card. Student performance can be rated at the secondary and/or post secondary level.

RATING SCALE:

5 - Performs task(s) with ability that consistently exceed(s) program minimum standards set for job entry level; very competent.

4 - Performs task(s) at job entry level; competent.

3 - Performs task(s) with periodic assistance.

2 - Performs task(s) with constant assistance.

1 - Is unable to perform task(s).

T - Demonstrated ability to perform task(s) at or above job entry level by taking a challenge test.

WPM - Actual production words per minute (WPM) obtained by student.

SCHOOL(S) ATTENDED:

DATES ATTENDED

INSTRUCTOR'S NAME(S)

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

TABLE V

The Grading Scale as it appears on the Clerical/Secretarial Competency Records

R & D AREA III: Development of a dissemination plan which encourages statewide adoption of articulation products.

The articulation process used by teachers and administrators to articulate secondary and post secondary curriculum in three pilot sites was developed for the purpose of using it repeatedly in the implementation efforts planned the following year. The pilot sites served as the grounds for trying out, revising and condensing the time required for accomplishing the developmental phase of each articulation effort.

(For description of schools participating in the pilot projects located in the Rochester region, the East Grand Forks-Thief River region and Duluth public schools, see Appendix A).

Each of the three pilot sites followed the basic articulation process outlined below. Actions described are referred to as the developmental phase of the articulation process. The articulation process has three phases: (I) Developmental Phase, (II) Implementation Phase, (III) Evaluation and Revision Phase.

I. Developmental Phase

1. The Director of the applicant post secondary school and the State Articulation Project Director develop a budget for the regional articulation sessions. Funds are obtained from the State Department of Education Vocational Division-Operations Section.
2. The Director of the applicant school sends letters of invitation to principals (directors) and superintendents of surrounding high schools and vocational centers, encouraging them to become involved in the regional articulation effort.
3. The State Articulation Project's consultant-on-site travels to visit the instructors in each of the surrounding schools. Verbal invitations are extended to them to participate in the articulation sessions.

4. A dinner meeting is held for administrators and instructors who wish further information about and/or wish to participate in the regional articulation sessions.
5. The actual 40 hours of developmental work is undertaken by the group.
 - a. Teachers work together using the Exploratory program workbook to choose tasks they currently teach.
 - b. The group writes terminal performance objectives (special forms are provided, see Appendix A) for all tasks so that standards and conditions of performance are agreed upon by all teachers of the same occupational programs.
 - c. Each teacher, using the terminal performance objectives just written by the group, reconsiders what is currently covered in his/her occupational program. Decisions are then made regarding what will be taught at each level. The goal is to help students be competent at performing the tasks selected upon leaving the occupational program.
 - d. Students graduate from an occupational program when they can perform all of the tasks required for that occupational program to the level of competency stated in the terminal performance objectives.
6. A commitment is made by each instructor regarding the number of hours he/she will spend in each area of Competency during the next school year. Emphasis is upon choosing the number of tasks that can realistically be taught so that students are competent upon leaving the program. (The decision is to be evaluated and revised at the end of that year).
7. Instructors decide upon how they wish to test students and determine whether or not they have reached each of the terminal performance objectives selected. Performance testing or written or oral examination may be selected. (See Appendix B). The group members may agree to develop its own standard tests for the region or each teacher may be responsible for developing his/her own evaluation instruments.

Regional sessions were conducted for the purpose of piloting and further developing the articulation process in March-April (Rochester), April-May (East Grand Forks-Thief River), and June-July (Duluth). Each site was encouraged to use the work done in previous sites for reference purposes. For this reason the total number of person hours required to

develop terminal performance objectives during the developmental phase decreased with each site.

Pilot Site for Articulation		
Rochester Region	East Grand Forks Thief River	Duluth
577 Person Hours N=12	409 Person Hours N=19	452 Person Hours N=8

TABLE VI

Total Number of person hours spent in each pilot articulation site for automotive mechanics articulation.

No further reduction in the numbers of hours necessary (40 hours per site) is anticipated. All teachers from articulating programs are expected to attend the 40 scheduled hours.

R & D AREA IV: Development of publications and audio visual presentations useful to local school personnel.

Articulation involves a conversion to competency based instruction. For this reason, the literature was reviewed and the vocabulary of the project was defined so that an informational booklet could be produced to inform teachers, coordinators and administrators about competency based instruction. The booklet that was developed is entitled: The Competency Based Route to Vertical Curriculum Articulation.

Task List booklets developed and printed include those for three auto mechanics occupations and the exploratory program workbook for the auto mechanics area. During July, 1976, task list booklets for 12 clerical secretarial occupational programs will be printed.

A slide tape presentation was developed and produced to summarize

the Research and Development activities of the Curriculum Articulation Project. It was written to summarize the current articulation information and actions within a 12 minute time frame. It has been particularly useful in explaining project goals and activities to committees of industry representatives.

R & D AREA V: Identify possible data sources that can be used in the future to update and revise the articulation products (task lists and competency records.

The sources of data that were identified as potentially useful for updating task lists and competency records were sought via verbal interaction with the groups described below.

The SYSTEM for UPDATING task lists and competency records is developed with the intention of continually bringing industry and education closer together in their perceptions of what a competent graduate is to be able to do upon becoming employed.

Data for updating in the future may be gathered by:

- a. obtaining feedback from state advisory board members (committees of industry representatives which are currently set up and working with state supervisors to determine trends and review programs.
- b. summarizing data supplied by students through the follow-up of graduates that actually took jobs in that occupation. A graduate may be asked:
 1. During this past year, how frequently did you perform each of the following tasks?
 2. How much time did you spend on-the-job actually doing each of the following tasks?
 3. Is it of moderate or more importance that you perform each of these tasks well?
 4. Do you feel it was necessary for you to be competent in performing this task when you were first hired?
 5. Are there any additional tasks which you feel you should have learned how to perform to be a better employee?

- c. obtaining instructor feedback regarding tasks they teach and tasks they have added to the task lists because of geographic preferences of employers.
- d. meeting with the same industry representatives who were initially involved in the review and development of task lists for the purpose of revising task lists.

This information could be used to continually update the articulation products (task lists and competency records) so that the emerging curriculum development system is kept current with the needs of graduates as they enter jobs in industry. It is anticipated that within the next three years it will be necessary to develop the actual procedure for collecting the necessary data for updating the articulation products now developed for automotive occupations. Speculative sources of updating data only, are cited at this time.

In conclusion, research and development areas that have produced new ideas, information and/or methods this past year have been described in the first five sections of this chapter. A discussion of additional service areas of the project follows.

SERVICE AREAS (1975-76)

Concomitant with the generation of new ideas, information, and methods, this research and development project also provided services to the state and nation. This past year two Service Areas were identified: I: Coordination of articulation project activities with other agencies/institutions in the State of Minnesota; II: Diffusion of project goals, information and products to other states that wish information and/or products developed through this funded project.

Service Area I: Coordination of articulation project activities with other agencies/institutions in the State of Minnesota. The project was managed during 1975 to coordinate activities with the State Articulation Steering committee. The Steering Committee is made up of Secondary and Post Secondary vocational administrators. Three meetings were held to obtain direction on articulation-related issues. Interaction with committee members helped to make decisions that ultimately would assure the usefulness of the articulation process throughout the state.

Program supervisors at the State Department of Education were involved in the articulation efforts for the purposes of 1) incorporating their input into the emerging curriculum development system and 2) more clearly defining the role of the articulation project and the role of state supervisors in vocational technical curriculum development and delivery in Minnesota.

Vocational administrators throughout the state have been updated on articulation project activities during regularly scheduled Directors' meetings. Opportunity for verbal interaction on articulation project activities is provided at these meetings.

Products developed by the Articulation Project were made available by the State of Minnesota, Department of Education - Vocational Division.

through the Minnesota Instructional Materials Center. Most products are available on a cost recovery basis to individuals both in Minnesota and from other states.

Teacher educators are encouraged to become involved in the regional articulation sessions so that they can familiarize pre-service and in-service teacher education classes with the procedures used and sources of curriculum content available to vocational teachers in the State of Minnesota. Selected teacher educators have observed articulation project activities throughout the past year.

Service Area II: Diffusion of project information products to other states that wish information and/or products developed through this funded project. Procedures for national diffusion of articulation project information and products have involved participation in national conferences, and discussions with articulation project directors from other states.

Contacts with project directors were made. The status of other current literature on the projects was obtained and reviewed. The table on the following page summarizes and makes comparisons between articulation projects in various states - including Minnesota.

ARTICULATION APPROACHES

	Minnesota	Texas	North Carolina	Wisconsin
PURPOSE/ DEFINITION OF ARTI- CULATION	*When curriculum is articulated, a student can progress from one level of training to the next desired level of training without an unnecessary gap or overlap in competence learned	*To provide secondary occupational learners who desire the opportunity to enter the post-secondary program at an advanced level without repeating material previously taken at the secondary level	*If occupational programs are articulated learners can be assured of receiving credit at the post-secondary level for work successfully completed in high school, thus avoiding repetition of work completed or retesting	*To provide a continuation, cooperation and coordination in the interest of providing a smooth transition for the continuing vocational student
APPROACH	*Planned Strategy (State Wide Approach) *Competency Based Instruction	*Planned Strategy (Local District Approach) *Competency Based Instruction	*Planned Strategy (Local District Approach) *Competency Based Instruction	*Unstructured approach *No specific model was advocated on a state-wide or district level *Each district was encouraged to implement its own procedure
INITIAL PROGRAM AREA INVOLVEMENT	*Auto Mechanics *Clerical/Secretarial	*Auto Mechanics	*Auto Mechanics *Business Education *Drafting	*Most instructors in basically all program areas were informed of the focus on articulation
BUSINESS/ INDUSTRY INVOLVEMENT	*Stratified sample of business/industry representatives from throughout state involved with educators in developing Task Lists and Competency Records	*Committee of Industry Representatives reviewed the Auto Mechanics Articulation Manual (competencies, performance objectives and student profile sheet) after it was completed by the project development committee (educators)	*Business/industry (craft) advisors involved with educators in developing Task Lists	*Business/industry representatives were not systematically involved

	Minnesota	Texas	North Carolina	Wisconsin
IMPLEMENTATION	*Pilot test the articulation procedure in two program areas (auto mechanics and clerical/ secretarial) in two pilot sites in the state	*Pilot test the articulation procedure in one program area (auto mechanics) one geographic area involving seven school districts.	*Pilot test the articulation procedure in three program areas (auto, business, drafting) in basically one local area (four high schools and one post-secondary school	*No systematic pilot test of a specific articulation procedure is underway. *Various school districts are working on developing their own articulation strategies
METHODOLOGY FOR CBI A. TASK LISTS	*Centrally developed by a representative state sample of instructors and business/industry representatives and made available to anyone in the state *Specific occupational titles identified with separate task lists	*Competencies <u>locally developed</u> by a committee of educators (primarily secondary and post-secondary instructors) *One comprehensive Competency List *No specific occupational titles identified with separate Competency List	*Locally developed by business/industry representatives and educators *One comprehensive Task List *No specific occupational titles identified with separate task list	*If developed, <u>local</u> efforts involved *No systematic effort to develop task lists
B. COMPETENCY RECORD	*Centrally developed by a representative state sample of instructors and business/industry representatives and made available to anyone in the state *Goes with the student from secondary to post-secondary level and to the employer	*Student Profile Sheet <u>locally developed</u> by a committee of educators *Goes with student from secondary to post-secondary level and to the employer	*Student Vocational Skills Record <u>locally developed</u> by educators *Students have a packet size objective and performance card *Goes with student from secondary to post-secondary and to the employer *Certificate of Occupational Qualification	*Student Profile Record encouraged *No systematic effort to develop student profiles
C. PERFORMANCE OBJECTIVES	*Locally developed by secondary and post-secondary instructors working as a group with assistance from local advisory committee	*Locally developed by a committee of educators (primarily secondary and post-secondary instructors)	*Locally developed by all secondary and post-secondary instructors in program area *Instructional Objectives Guide developed	*No systematic effort to develop performance objectives *Some local efforts may be underway

	Minnesota	Texas	North Carolina	Wisconsin
D. CRITERION REFERENCED EVALUATION OR PERFOR- MANCE TESTING	*Locally developed by secondary and post-second instructors working as a group with assistance from local advisory committee *Emphasis on Applied Performance Testing	*Not addressed in Articulation Publications	Locally developed by all secondary and post-secondary instructors in program area *Emphasis on Applied Performance Testing	*No systematic effort to develop evaluation measures
E. INSTRUCT- IONAL DELIVERY SYSTEM	*Traditional or Personalized *May include open entry/open exit philosophy (local school district decision)	*Traditional or Personalized *May include open entry/open exit philosophy (local school district decision)	*Personalized	*No approach appears to be advocated

TABLE VI:
Comparisons between Minnesota's Articulation Project and similar actions in other states.

National diffusion of project information and products was accomplished through discussion held with, and information mailed to directors of two funded clearinghouses for national research and development products and results. (Clearinghouse for Applied Performance Testing-CAPT- and Task Inventory Exchange). Both agencies published notice of Minnesota's Curriculum Articulation Project. In addition, project documents were announced and made available through AIM/ARM (Abstracts of Instructional and Research Materials in Vocational Technical Education) and ERIC (Educational Resources Information Center).

CHAPTER III

EVALUATION OF THE PROJECT GOAL

INTRODUCTION

This chapter evaluates the extent to which the stated goal of the curriculum articulation project was reached. The goal for 1975-76 was to research and develop a procedure which could be used statewide to vertically articulate curriculum between the secondary and post secondary levels of vocational technical education. This goal includes both (a) the development and validation of a procedure for developing those articulation products (task lists and competency records) needed for articulation and (b) the development of a regional process for teachers and administrators to follow as they utilize the articulation products developed for vocational education throughout the state of Minnesota. Formative evaluation was an important part of this developmental research effort in that many pieces of data were formally and informally gathered, used and re-evaluated as the developmental process continued. The success of this research and development effort was to be determined by whether or not the process developed for articulation is considered suitable for adoption and use statewide.

EVALUATION

A procedure for developing articulation products (task lists and competency records) on a statewide basis was successfully developed (through actions taken in automotive mechanics) and validated (through the same actions being taken in clerical/secretarial occupations). In both instances the procedure was reasonable in cost and efficient in terms of the length of time required to produce the task lists and competency records for each program area. Articulation products were developed and printed for auto mechanic occupations and developmental efforts are underway in twelve (12) clerical/secretarial occupations utilizing this

same procedure. In both instances, the procedure was reasonable in cost and efficient in terms of the length of time required to produce task lists and competency records. Three (3) auto mechanics occupational program task list and competency record booklets, plus an exploratory auto mechanics program workbook were developed over a period of 18 months at a cost of \$1,400; this cost included a parttime technical subject matter consultant and travel expenses for 25 industrial representatives.

The process developed for teachers and administrators to follow in regional articulation sessions was successfully used through the developmental phase of the articulation effort in each of the three pilot sites. It is anticipated that the same pilot schools will continue to be involved this next year as the evaluation and revision phase of the articulation process is researched and developed.

Products developed by the curriculum articulation project this past year include: The Competency Based Route to Vertical Curriculum Articulation.

Auto Mechanics task list booklets:

Lubrication Specialist

Service Center Mechanic

Automotive Mechanics

Exploratory Program for Auto Mechanics

Clerical/Secretarial task list booklets:

Office Services Aid

Typist

General Office/Typist

Receptionist

Secretary/Non Shorthand

Secretary/Shorthand

Data Entry Operator

Medical Secretary

Legal Secretary

Educational Office Personnel

Correspondence Specialist and Administrative
Assistant

Correspondence Supervisor

Last year the following document was re-printed:

Handbook for Vocational Instructors Interested in
Competency Based Instruction

All of the products developed by the Curriculum Articulation are available on a cost recovery basis through the Minnesota Instructional Materials Center (MIMC), 3300 Century Avenue, White Bear Lake, Minnesota, 55110.

In addition to the research and development areas in which the project took action, services were provided by the articulation project in 1975-76. The number of services provided is presented as evaluative data that exemplifies the contribution of this project both on the state and national level.

Project goals, information and products were diffused statewide and nationally through the following actions:

/In Minnesota/

- (1) A presentation was made to the State R&D Review Committee for Vocational Education in January of 1976.
- (2) Three project updating and information sessions were conducted throughout the year at regularly held meetings for secondary and post secondary directors in the state of Minnesota.
- (3) Single copies of publications were mailed to every post secondary vocational program director, and to each secondary center director.
- (4) Members of the working committees and industrial review committees for task list development received copies of the task list booklet as soon as they were printed.
- (5) Sessions were held with auto mechanics and clerical/secretarial occupational programs instructors for the purpose of informing them of the goals and progress of the project.
- (6) The Minnesota Instructional Materials Center was given permission to reprint project publications for the purpose of

making them available at cost to vocational programs in Minnesota.

- (7) A session was held at the State Teacher Education Meeting held in the fall of 1975 for the purpose of informing teacher educators about project goals and obtaining their input. A follow-up open house was held in May of 1976 for the same purpose.

/Nationwide/

- (1) Telephone contacts were made with articulation project directors in four other states (Texas, North Carolina, Wisconsin and Oregon).
- (2) Information about Minnesota's articulation project, along with copies of publications were mailed to CAPT (Clearinghouse for Applied Performance Testing in Oregon) and the Task Inventory Exchange at Ohio State University. Both agencies published information about the project. In addition, the report and products from previous years and this year are available through ERIC and/or AIM/ARM.
- (3) A presentation was made at the National Association for Supervision and Curriculum Development Meeting held in March, 1976.
- (4) Contacts were made between state supervisors of auto mechanics and clerical/secretarial occupations in Minnesota and persons in like positions in other states.
- (5) More than 50 letters of request were received by the project and answered through person-to-person correspondence during 1975-76.
- (6) Each State Supervisor of Vocational Education received a copy of last year's final report and the booklet entitled Competency Based Route to Vertical Curriculum Articulation.

Curriculum related efforts of the articulation project were coordinated with (a) the Operations Staff at the State Department of Education, (b) curriculum directors in local schools, (c) administrators, (d) the Minnesota Instructional Materials Center, and (e) interested teacher educators.

CONCLUSION

After considering verbal and written feedback from administrators and instructors involved in each of the three pilots, the overall evaluation of the success of the articulation project for 1975-76 was positive. As a result, funds will be available for 1976-77 from the State Department of Education-Vocational Division, Operations Section, for implementing the regional articulation process in auto mechanics occupations throughout the State of Minnesota.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

As a result of project research and development activities this past year, several conclusions and recommendations can be made. The recommendations made in this chapter refer to (1) the role and responsibilities of the curriculum articulation project in relationship to the role and responsibilities of other state agencies and employees concerned with vocational curriculum development, and (2) the areas of curriculum related (a) service, and (b) research and development in which the State Department of Education may wish to provide leadership in the next five years.

CONCLUSIONS

It can be concluded that a procedure for developing articulation products for use Statewide has been developed and validated. The products are utilized on a regional basis according to an established articulation process which has been successfully used - throughout the developmental phase of articulation - in three regional pilot sites in Minnesota. Both the procedure for developing articulation products and the regional articulation process have been adopted, for continued articulation, by the State Department of Education - Vocational Division. Funds for auto mechanics articulation will be available statewide during 1976-77; the same articulation process will be followed as was developed this past year. Pilots will be conducted next year in clerical/secretarial occupations for the purpose of validating the articulation process (which was used in automotive occupations) in another program area. Three new program areas will be identified for task list and competency record development during 1976-77.

RECOMMENDATIONS

Curriculum articulation, as it occurs via the process described, provides the structure needed for a statewide curriculum development system for Minnesota. The system can be used on a continuing basis to update, revise and impact upon the quality of vocational curriculum throughout the state. Because of this capability, it is recommended that curriculum development activities be carefully planned and coordinated at the State Department of Education through careful delimitation of roles and responsibilities of Vocational Division agencies and employees. State supervisors have traditionally had as part of their responsibilities the role of initiating state activities (conferences, curriculum committees, etc.) that produce qualitative improvements in occupational curriculum for those program areas under their direct supervision. Recognizing the time commitments and the observed areas of strong contribution to Vocational Curriculum statewide, the following recommendations are made in regard to role delineation of Vocational Division agencies and employees:

State supervisors contribute to the emerging curriculum development system (Curriculum Articulation Project) by:

- (a) identifying key persons who can contribute subject matter/occupational expertise
- (b) attending many articulation project meetings during both the materials development and articulation implementation phases, for the purpose of (1) clarifying state policy as it applies to their areas of supervision and (2) communicating with teachers about subject matter issues
- (c) making recommendations to the articulation project director/staff member so that information from the emerging system can be used by them in their roles as state supervisors.

Supervisors can utilize the information generated by the emerging curriculum development (Curriculum Articulation Project) system in the following ways:

- (a) to identify occupational programs and areas of competency within those occupational programs where teachers need professional upgrading/updating; and then to supply opportunities to their teachers through conferences, courses, workshops,

mailings, etc.

- (b) to assemble instructional materials where none are available and where teachers request help. This can be done by making small grants available to teachers for the development of instructional aids/teaching aids which can be used by other teachers in helping their students learn to perform certain tasks competently
- (c) to identify equipment and facility needs of teachers at the local level
- (d) to give assistance to emerging programs in new locations of Minnesota so that they will include content like other programs having the same occupational program title (e.g. medical secretary)

It is also recommended that the curriculum articulation project be funded in the future with the understanding that it has two major areas of responsibility. One area would be service to the State of Minnesota. The other area would be research and development. Under the service area, articulation of all program areas could be accomplished on a scheduled basis. (A recent survey of secondary and post secondary directors resulted in the naming of 36 program areas in which they perceived a need for immediate articulation assistance). Under the research and development area of project responsibility, new ways to meet the emerging challenges of Vocational Education could be developed. During the next five years it is anticipated that there will be a need for: (1) practical guidelines for competency assessment (regional construction of performance tests and regionally standardized written tests based on performance) (2) alternative program management strategies that accommodate open entry/open exit provisions, (3) worker mobility charts that can be used by vocational guidance counselors and vocational instructors to make vocational curriculum offerings meaningful to students, (4) content selection procedures for creating exploratory options which can be made available to students who are in the early stages (cluster exploration) of occupational decision making, (5) instrumentation and procedures for efficiently updating

curriculum articulation products, and (6) In-service procedures for new staff hired at the local level after the developmental phase of curriculum has been accomplished in that region.

SUMMARY OF THE REPORT

Time Covered by the Report

July 1, 1975 through June 30, 1976

Goal of the Project

The goal of this project is to develop and pilot a process for vertically articulating curriculum between the secondary and post secondary levels of vocational technical education throughout the state of Minnesota. This goal includes both (a) the development and validation of a procedure for developing those statewide products (task lists and competency records) needed for articulation and (b) the development of a process for teachers and administrators to follow as they utilize the articulation products through working with schools in their region of the state.

Procedures followed:

The five areas of research and development for the project included (I) Articulation product development, (II) Articulation process development, (III) Dissemination plan development, (IV) Production of publications needed for regional articulation, (V) Identification of data sources for updating articulation products in future years. Developmental research procedures are described in detail for each of the five areas.

Two service areas of the project were: (I) The coordination of articulation project activities with other agencies/institutions in the State of Minnesota and (II) Diffusion of project goals, information and products to other states that wish information and/or products developed through this funded project. Procedures followed in completing activities in the two service areas were undertaken primarily to support and increase the usefulness of project activities to Minnesota's vocational system as a

whole.

Results and Accomplishments:

A procedure for developing articulation products was developed and validated. A regional process for articulation was successfully piloted through the developmental phase of automotive mechanics articulation in three pilot sites in Minnesota. The dissemination plan developed is funded by the State Department of Education - Vocational Division next year. The data sources for updating articulation products in future years appears to be cost effective at this time.

In regard to accomplishments in the service areas, five publications have been printed during this past year, and 12 additional publications are currently being printed. Diffusion of project goals, information and products was accomplished through audio visual media, conference participation in Minnesota and at the National level, person-to-person correspondence and publications of short articles in newsletters and clearing-house bibliographies.

Evaluation:

Both the procedure for developing articulation products (task lists and competency records) on a statewide basis and the regional articulation process have been adopted by the State Department of Education - Vocational Division. Funds for auto mechanics articulation will be available statewide during 1976-77. Pilots will be conducted next year in clerical/secretarial occupations for the purpose of validating the articulation process (which was used in automotive occupations) in another program area. Three new program areas will be identified for task list and competency record development during 1976-77, because the evaluation of the project was positive.

Conclusions and Recommendations:

It can be concluded that continued articulation efforts are warranted in Minnesota along the same lines as those of recent years. It must be noted, however, that evaluation of the articulation process to date relates to its usefulness to teachers and administrators. No effect on students will be seen for two years.

Two recommendations are made as a result of this project. First, suggested future roles and curriculum related responsibilities of the Vocational Division's State Supervisors at the State Department of Education are noted, as they relate to curriculum articulation and development. Second, roles of employees of state funded projects that are concerned with vocational technical curriculum development and dissemination are recommended. It is suggested that in future years this project should have two areas of responsibility (a) service and (b) research and development. Some specific areas in which there will be a need for research and development during the next five years are cited in the recommendations chapter of this report.

PRODUCTS DEVELOPED BY

THE CURRICULUM ARTICULATION PROJECT TO DATE

1. Burger, Laura; Lambrecht, Judy; Allen, Deena; and Loebs, James:
Handbook for Vocational Instructors Interested in Competency Based Education 1974. Research Coordinating Unit for Vocational Education, University of Minnesota, Minneapolis, Minnesota. (Available through ERIC, AIM/ARM, and MIMC)
2. Burger, Laura:
Developing Articulated High School and Post High School Vocational Technical Curricula in Minnesota A Final Report, 1975. Research Coordinating Unit for Vocational Education, University of Minnesota, Minneapolis, Minnesota. (Available through ERIC)
3. Burger, Laura; Allen, Deena, and Loebs, James:
Competency Based Route to Vertical Curriculum Articulation, 1975. Research Coordinating Unit for Vocational Education, University of Minnesota, Minneapolis, Minnesota. (Available through MIMC)
4. Automotive Task Lists -
Automotive Mechanics, Service Center Mechanics, Lubrication Specialist, Exploratory Program for Auto Mechanics (1975). (Available through MIMC and AIM/ARM)
5. Clerical/Secretarial Task Lists:
Office Services Aid, Typist, General Office/Typist, Secretary/Non-Shorthand, Secretary/Shorthand, Data Entry Operator, Medical Secretary, Legal Secretary, Educational Office Personnel, Correspondence Specialist and Administrative Assistant, Correspondence Supervisor. 1976 (Available through MIMC)
6. Terminal Performance Objectives for Competency Based Instruction. Automotive Mechanics Occupations. A directory was developed in each of the three pilot sites.

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- Mager, Robert F. and Beach, Kenneth M. Jr. Developing Vocational Instruction. Belmont, California: Fearon, 1967.
- Mandy, Russell M. and Stapleton, Clement E. Articulation of Vocational Education Curriculum Between Secondary and Post Secondary Levels in Wisconsin. (Final Report, Project No. O.E.G. 5-74-0145). Minomonic, Wisconsin: University of Wisconsin, Stout, August, 1975.
- McMahon, Gordon G. Curriculum Development in Trade and Industrial and Technical Education. Columbus, Ohio: Charles E. Merrill, 1972.
- Owens, John and Chumbley, John. Auto Mechanics Program Articulation - Dallas and Tarrant Counties. Dallas: Division of Occupational Research and Development, Texas Education Agency, no date.
- Popham, W. James. Systematic Instruction. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970.
- Popham, W. James. The Uses of Instructional Objectives - A Personal Perspective. Belmont, California: Fearon, 1973.
- Popham, W. James and Baker, Eva L. Planning an Instructional Sequence. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970.
- A Proposal Design for Improving Articulation Between Secondary and Post Secondary Occupational Programs in Dallas and Tarrant Counties. Arlington: Texas: Regional Planning for Occupational Education, no date.
- Smith, Brandon B. and Moss, Jerome, Jr. Report of a Seminar: Process and Techniques of Vocational Curriculum Development. Minneapolis: Research Coordinating Unit for Vocational Education, University of Minnesota, April, 1970.

APPENDICES

APPENDIX A

Articulation Sessions (March - April 1976)

Rochester Region

Developmental phase

Three full days and six evening sessions were attended by auto mechanics instructors in the Rochester region of Minnesota. Mr. Coler Peterson (who is a member of the working committee that developed the automotive task lists and competency records and is a full time staff member at Rochester Area Vocational Technical Institute) provided leadership. The individuals who participated and the location of the schools from which they came are presented below:

<u>Instructor</u>	<u>School</u>
Coler Peterson, Consultant-on-site	Rochester AVTI
Don Stnelow	Rochester AVTI
Ralph Jewell	Rochester AVTI
Seevert Gronvold	Rochester AVTI
Max Gerand	Rochester AVTI
Glen Papenfuss	Dodge Center High School
Floyd Davidson	Hayfield High School
Dave Kennedy	Pine Island High School
Bill Lehn	Preston Vocational Center
Bill Tasaler	Stewartville High School
Don Laumb	Rushford Vocational Center
Vern Westbrook	Rochester - John Marshall High
Ron Felt	Rochester - Mayo High School

Articulation Sessions (June - July 1976)

East Grand Forks - Thief River Falls Region

Developmental phase

Five fulls days and one evening session were attended by auto mechanics instructors in the East Grand Forks - Thief River Falls region of Minnesota. Mr. Marson Rinkenberger (who is a member of the working committee that developed the automotive task lists and competency records and is a full time teacher at Crookston High School) provided leadership. The individuals who participated and the location of the schools from which they came are presented below:

<u>Instructor</u>	<u>School</u>
Marson Rinkenberger, Consultant-on-site	Crookston High School
Arly Hams	Red Lake Falls Center
Ken Henry	East Grand Forks Center
Terry Moe	East Grand Forks Center
Frank Mack	East Grand Forks AVTI
John Steinke	East Grand Forks AVTI
Ray Olsen	Thief River Falls AVTI
Alvin Aaseby	Thief River Falls AVTI
Duane Brown	Thief River Falls AVTI
Bill Bohn	Bagley Center
Clint Braaten	Bagley Center
Walter Wendler	Baudette
Jerry Molacek	Tri River Center
Marvin Gunderson	Agassiz Valley Center

Articulation Sessions (April - May 1976)

Duluth Public Schools

Developmental phase

Five full days of articulation sessions were attended by auto mechanics instructors from Duluth Public Schools, Duluth, Minnesota. Mr. Gary Zaudtke (who is a member of the working committee that developed the automotive task lists and competency records and is a full time staff member at Duluth Area Vocational Technical Institute) provided leadership. The individuals who participated and the schools from which they came are presented below:

<u>Instructor</u>	<u>School</u>
Gary Zaudtke, Consultant-on-site	Duluth AVTI
Willard Morris	Duluth AVTI
Vern Verhel	Duluth AVTI
Charles McDonald	Central High School
Bill Olson	Vocational Center
Joe McNamara	Service Station
Al Kurschner	Vocational Center
Tony Emanuel	East High School